

ROTATIONAL MOTION IN TETRAHEDRAL NUCLEI

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Symmetries of the nuclear shape are a powerful tool to probe the microscopic models used in nuclear structure. Low-lying states possessing the tetrahedral symmetry have been predicted to exist in several exotic nuclei in both the proton- and neutron-rich side of the valley of stability [1,2,3]. These predictions are based on independent mean-field calculations with various forms of mean-field, some including pairing interactions. The tetrahedral symmetry is realized in nuclear structure by a non-axial octupole deformation. While all types of quadrupole shapes have been extensively studied in the past, both theoretically and experimentally, very little is known today about the collective excitations of shapes combining non-axiality with octupoles degrees of freedom. Yet, they are crucial in order to obtain any experimental evidences of the tetrahedral symmetry.

The talk aims at giving hints about some of the most characteristic features of tetrahedral nuclei, especially the structure of their collective rotational bands. The following issues will be addressed:

- The influence of the pairing interaction on the stability of tetrahedral energy minima will be discussed. Various pairing models have been applied in the nuclei which are the best candidates for the tetrahedral symmetry, and the main results of this analysis will be summarized.
- The moments of inertia have been estimated from microscopic models, and compared in both the tetrahedral and the more standard prolate-deformed configuration. The results appear very encouraging for further experiments.
- The so-called Generalized Rotor Model has been applied to nuclei in both cases of a tetrahedral symmetry and a traditional axial symmetry. Branching ratios between states belonging to different rotational bands happen to be extremely sensitive to the symmetries of the rotor. An attempt of extracting solid criteria for the spectroscopy of tetrahedrally-deformed rotating nuclei will be presented.

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